

REMARKS

Claims 1-26 are currently pending. Claims 1-3, 6-16, and 19-26 have been withdrawn from further consideration. Claim 4 is amended herein to clarify the claimed subject matter. Claims 17 and 18 are canceled herein without prejudice. Accordingly, claim 4 as amended and claim 5 are under consideration.

Any amendment, however, is not to be construed as abandonment of any subject matter of the originally filed application. Accordingly, it is to be understood that Applicant reserves the right to reintroduce subject matter deleted from the application by the foregoing amendments and to file one or more divisional, continuation, and/or continuation in part applications directed to such subject matter.

Support for amendment to the claims is found throughout the specification and in the original claims. Specifically, support for amendment to claim 4 is found, for example, in original claim 4 and at page 12, lines 1-2 and 12-13 and Figure 1, wherein support for covalent attachment is presented; and, for example, at page 16, line 29 through to page 17, line 29, wherein support for resequencing is found. No issue of new matter is introduced by these amendments.

Rejections under 35 USC § 103

Claims 4 and 17 are rejected under § 102(b) as allegedly unpatentable over Nazarenko et al. [United States Patent Number (USPN) 6,090,552; issued 2000] in view of Cheeseman (USPN 5,302,509; issued 1994). Although this rejection is set forth as a rejection under § 102(b), Applicant has interpreted this classification as reflective of a typographical error on the part of the Examiner. It appears that this rejection should have been identified as a rejection under §103(a), and has been treated as such. Clarification of this issue is deferentially requested. Claim 17 is canceled herein, thereby obviating any rejection of this claim. In any event and in view of the clarifying amendments to the pending claims and arguments presented herein, this rejection is respectfully traversed.

Claim 4 is amended herein to clarify that the claimed method calls for covalently

attaching a template nucleic acid to the 5' end of a hairpin nucleic acid and extension of the hairpin nucleic acid, which serves as a primer, to generate a nucleic acid strand complementary to the first portion of the template nucleic acid, followed by nicking and removal of the complementary strand so generated. Claim 4 also calls for a subsequent resequencing step of the first portion of the single-stranded template nucleic acid whereby the 3' end of the hairpin nucleic acid again acts as a primer for extension to generate a second nucleic acid strand complementary to the first portion of the single-stranded template nucleic acid, wherein the template and the second complementary strand are covalently attached via the intervening hairpin nucleic acid. The instant invention differs, therefore, from Nazarenko et al. in at least two respects. At the outset, Nazarenko et al. do not teach a method that calls for covalent attachment of a template nucleic acid directly to the 5' end of a hairpin nucleic acid as presently claimed. Nor do Nazarenko et al. perform a resequencing step that produces a second complementary strand, particularly wherein the template and second complementary strand are covalently attached via the hairpin nucleic acid as claimed in claim 4. In contrast, the hairpin primers of Nazarenko et al. are attached to complementary template nucleic acids via hybridization. Since the present invention calls for covalent attachment of the template to the hairpin primer and covalent attachment of the template, via the intervening hairpin primer, to the second complementary strand extended from the hairpin primer, Nazarenko et al. fail to teach at least these recited method steps of claim 4. That being the case, the Nazarenko et al. patent does not render obvious the claimed method.

Moreover, the Cheeseman reference fails to remedy the defects of Nazarenko et al. Cheeseman also fails to teach a method that calls for covalent attachment of a template nucleic acid to a hairpin primer. This reference is also silent with respect to a method that calls for covalent attachment of a template, via an intervening hairpin primer, to a second complementary strand extended from the hairpin primer during a resequencing step. The primers of Nazarenko et al. and Cheeseman are attached to complementary template nucleic acids via hybridization. Moreover, when considered individually or in combination, these references also fail to teach a method that includes a resequencing step whereby a second strand complementary to the

template is generated which is covalently attached to the template via a hairpin nucleic acid. Accordingly, the combination of these references fails to lead an ordinarily skilled practitioner to the presently claimed invention.

In view of the above arguments, the Examiner is respectfully requested to reconsider the validity of the rejection of claims 4 and 17 under 35 U.S.C. §103 and withdraw the rejection.

Claims 5 and 18 are rejected under 35 USC § 103(a) as allegedly unpatentable over Nazarenko et al. (USPN 6,090,552; issued 2000) in view of Cheeseman (USPN 5,302,509; issued 1994) and further in view of Chernov et al. (United States Patent Application No. 2004/0086866; filed 10/2002). Claim 18 is canceled herein, thereby obviating any rejection of this claim. In view of the clarifying amendments to the pending claims and Applicant's arguments, this rejection is respectfully traversed for the reasons set forth herein.

The pending claims have been amended to clarify that the method of the present invention calls for covalently attaching a template nucleic acid to the 5' end of a hairpin nucleic acid and, following a series of intervening steps, subsequently calls for resequencing the first portion of the template nucleic acid by using the 3' end of the hairpin nucleic acid as a primer and extending the primer to generate a second nucleic acid strand complementary to the first portion of the template nucleic acid. Briefly, the combined teachings of Nazarenko et al. and Cheeseman fail to teach a method that calls for covalent attachment of a template nucleic acid to the 5' end of a hairpin nucleic acid. Moreover, the combined teachings of these references also fail to teach a method that includes a resequencing step whereby a second strand complementary to the template is generated which is covalently attached to the template via a hairpin nucleic acid.

With respect to the above rejection, the Examiner acknowledges that the combined references of Nazarenko et al. and Cheeseman do not teach that hairpin probes are attached to a solid support. The Examiner relies on Chernov et al. for teaching the use of hairpin probes attached to a microarray. The Chernov et al. reference, however, fails to remedy the defects of the combined teachings of Nazarenko et al. and Cheeseman with respect to the instant claims. The application of Chernov et al. describes methods and compositions for creating double-stranded

nucleic acid (e.g. dsDNA) microarrays. Like Nazarenko et al. and Cheeseman, Chernov et al. fail to teach a method that calls for covalent attachment of a template nucleic acid to the 5' end of a hairpin nucleic acid. Chernov et al. also fail to teach a method that includes a resequencing step whereby a second strand complementary to the template is generated and the second complementary strand so generated is covalently attached to the template via a hairpin nucleic acid.

In that the claimed method calls for covalent attachment of a template nucleic acid to the 5' end of a hairpin nucleic acid and a resequencing step that generates a second strand complementary to the template which is covalently attached to the template via the hairpin nucleic acid, these references fail to teach at least these two recited method steps. Moreover, there is no teaching or suggestion in these references when considered alone or in combination that would lead a skilled practitioner to the present invention. That being the case, the deficiencies of Nazarenko et al. are not remedied by the teachings of Cheeseman and Chernov et al. Accordingly, these references, alone and in combination, fail to render obvious the instantly claimed method.

In view of the above, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 5 and 18 under 35 U.S.C. §103.

Fees

No fees are believed to be necessitated by this amendment. However, should this be an error, authorization is hereby given to charge Deposit Account No. 11-1153 for any underpayment or to credit any overpayment.

Conclusion

It is submitted, therefore, that the claims are in condition for allowance. No new matter has been introduced. Allowance of all claims at an early date is solicited. In the event that there are any questions concerning this amendment, or application in general, the Examiner is respectfully urged to telephone the undersigned so that prosecution of this application may be

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expedited.

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Enclosures: Petition for a One-Month Extension of Time
Request for Continued Examination